

WHAT IS CLAIMED IS:

1. An apparatus for mixing fluids, said apparatus comprising:
  - (a) a housing having an interior with capillary dimensions and
  - (b) a pressure activated mechanism in fluid communication with said interior, said pressure activated mechanism being activatable to cause reciprocal motion of fluid in said interior resulting in mixing of fluid in said interior.
2. An apparatus according to Claim 1 wherein said interior comprises a linear array of features for conducting chemical reactions.
3. An apparatus according to Claim 2 wherein said features comprise biopolymers.
4. An apparatus according to Claim 2 wherein said linear array is a linear microarray.
5. An apparatus according to Claim 1 further comprising an activating mechanism for activating said pressure activated mechanism.
6. An apparatus according to Claim 1 wherein said pressure activated mechanism is a compressible member and wherein said apparatus further comprises a deflection mechanism for deflecting said compressible member.
7. An apparatus according to Claim 1 further comprising a fluid dispensing device.
8. An apparatus for conducting hybridization reactions, said apparatus comprising:
  - (a) a housing having an interior with capillary dimensions, said interior comprising a linear microarray of biopolymers for conducting hybridization reactions,
  - (b) a compressible member in fluid communication with said interior, said

compressible member being deflectable to cause reciprocal motion of fluid in said interior resulting in mixing of fluid, and

- (c) a deflection mechanism for deflecting said compressible member.

5 9. An apparatus according to Claim 8 further comprising a fluid dispensing device.

10. An apparatus according to Claim 8 wherein said biopolymers are polynucleotides or polypeptides.

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- 11. A method for mixing a fluid, said method comprising:

- (a) introducing a fluid into a housing of an apparatus according to Claim 1, and

- (b) activating said pressure activated mechanism sufficient to cause reciprocal movement of said fluid to mix said fluid but insufficient to cause said fluid to exit said housing.

15 12. A method according to Claim 11 further comprising after step (b) activating said pressure activated mechanism sufficient to cause said fluid to exit said 20 housing.

- 13. A method for conducting chemical reactions, said method comprising:

- (a) introducing a sample into a housing of an apparatus according to Claim 2, and

- (b) incubating said sample in said housing under conditions for carrying out said chemical reactions and during said incubation activating said pressure activated mechanism sufficient to cause reciprocal movement of said sample in said housing to mix said sample but insufficient to cause said sample to exit said housing.

25 30 14. A method according to Claim 13 further comprising activating said pressure activated member sufficient to remove said sample from said housing.

15. A method for conducting hybridization reactions, said method comprising:

(a) introducing a sample into a housing of an apparatus according to Claim 3 wherein said biopolymers hybridize to analytes in said sample, and

5 (b) incubating said sample in said housing under conditions for carrying out said hybridization reactions and during said incubation activating said pressure activated mechanism sufficient to cause reciprocal movement of said sample to mix said sample but insufficient to cause said sample to exit said housing.

10 16. A method according to Claim 15 further comprising activating said pressure activated mechanism sufficient to remove said sample from said housing.

15 17. A method according to Claim 16 further comprising introducing a wash fluid into said housing and activating said pressure activated mechanism sufficient to cause reciprocal movement of said wash fluid but insufficient to cause said wash fluid to exit said housing

18. A method according to Claim 17 further comprising activating said pressure activated mechanism sufficient to remove said wash fluid from said housing.

20 19. A method according to Claim 16 further comprising examining said linear array for the results of said hybridization reactions.

25 20. A method according to Claim 15 wherein said housing is part of a microfluidic system.

21. A method according to Claim 15 wherein said housing is a channel in a microfluidic system.

30 22. A method according to Claim 15 wherein said features are polynucleotides or polypeptides.

23. A method according to Claim 15 wherein said linear microarray comprises at least ten features.

24. A method comprising forwarding data representing a result obtained from  
5 a method according to Claim 19.

25. A method according to Claim 24 wherein the data is transmitted to a  
remote location.

10 26. A method comprising receiving data representing a result obtained from a  
method according to claim 19.

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